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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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2292 7590 03/22/2007 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			EXAMINER HU, RUI MENG	
			ART UNIT	PAPER NUMBER
			2618	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/22/2007	ELECTRONIC

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If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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**Office Action Summary**

Application No.

10/527,424

Applicant(s)

IDO, JUN

Examiner

RuiMeng Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 7-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 and 14 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-12 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claim 6 have been considered but are moot in view of the new ground(s) of rejection.

### *Response to Amendment*

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. **Claims 1, 3-5 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Abe et al. (JP 06-303171)** in view of **Yamamoto (US Patent 6151372)**.

Consider **claim 1**, Abe et al. clearly disclose a diversity receiver comprising (figure 1): a plurality of demodulation paths (figure 1, receive sections 2 and 12) for demodulating received signals and outputting demodulated signals; a power ratio comparator (receiving level ratio judging section 22) for calculating a power ratio from a

first power corresponding to a first received signal on one of the demodulation paths (RSSI 1) and a second power corresponding to a second received signal on another one of the demodulation paths (RSSI 2), and comparing the power ratio (level ratio judging section 25) with a predetermined threshold value (threshold store 26); a signal selector (control section 8, switch 6) for selecting one of the demodulated signals output from the plurality of demodulation paths and outputting the selected demodulated signal; an equal-gain signal combiner (synthetic section 5) for combining the demodulated signals output from the plurality of demodulation paths with predetermined gains, and outputting a combined demodulated signal (control section 8, switch 7); and a demodulated signal output unit for outputting one of the demodulated signals, either the selected demodulated signal or the combined demodulated signal, responsive to a result of the comparison in the power ratio comparator (control section 8, switches 6 and 7) (paragraphs 0006, 0007 and 0010, figures 1 and 2).

Abe et al. clearly disclose the diversity receiver further comprising an estimated power value calculator (receiving level detecting element 3) that outputs, as said first power.

However Abe et al. fail to disclose an estimated power value obtained from the result of channel characteristic estimation using a reference signal contained in the first received signal.

In the same field of endeavor, Yamamoto clearly discloses a diversity receiver comprises a channel characteristic estimating section that uses a reference signal

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contained in the received signal for channel characteristic estimation (column 4 lines 6-13).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Yamamoto into the diversity receiver of Abe et al. as to use a reference signal contained in the received signal for estimating the power level, as an alternative of using the received data signal.

Consider **claim 3, as applied to claim 1 above**, Abe et al. as modified by Yamamoto clearly disclose wherein the threshold value used in the power ratio comparator is determined from a condition that the received-power-to-noise-power ratio value of the demodulated signal obtained by combining the plurality of demodulated signals with equal gain equals a maximum received-power-to-noise-power ratio among the received-power-to-noise-power ratios of the plurality of demodulated signals (the absolute value of  $(RSSI1-RSSI2)$  compares with threshold  $a$ ) (paragraph 0010, figure 2).

Consider **claim 4, as applied to claim 3 above**, Abe et al. as modified by Yamamoto clearly disclose wherein the demodulated signal output unit outputs either the demodulated signal obtained by combining the plurality of demodulated signals with equal gain (synthetic section 5) or the selected demodulated signal responsive to the power ratio and the threshold value determined under said condition (control section 8, switches 6 and 7) (paragraphs 0009 and 0010).

Consider **claim 5, as applied to claim 3 above**, Abe et al. as modified by Yamamoto clearly disclose wherein the signal selector selects a demodulated signal with a maximum received-power-to-noise-power ratio among the received-power-to-noise-power ratios (RSSI1 and RSSI2) of the demodulated signals output from the demodulation paths (paragraph 0009).

Consider **claim 15**, Abe et al. clearly disclose a diversity receiving method including a plurality of demodulating processes for demodulating a received signal and outputting a demodulated signal (figure 1), comprising the steps of: calculating a power ratio from a first power corresponding to a first received signal in one of the demodulation processes (RSSI1) and a second power corresponding to a second received signal in another one of the demodulation processes (RSSI2), and comparing the power ratio with a predetermined threshold value (figure 2, level ratio judging section 25, threshold store section 26); selecting one of the demodulated signals output from the plurality of demodulation processes and outputting the selected demodulated signal (control section 8, switch 6, paragraph 0009); combining the demodulated signals output from the plurality of demodulation paths with predetermined gains (synthetic section 5), and outputting a combined demodulated signal (control section 8, switch 7, paragraph 0010); and outputting one of the demodulated signals, either the selected demodulated signal or the combined demodulated signal, responsive to a result of the comparison in the step of calculating (paragraphs 0009 and 0010, figures 1 and 2).

Abe et al. clearly disclose the diversity receiver further comprising an estimated power value calculator (receiving level detecting element 3) that outputs, as said first power.

However Abe et al. fail to disclose an estimated power value obtained from the result of channel characteristic estimation using a reference signal contained in the first received signal.

In the same field of endeavor, Yamamoto clearly discloses a diversity receiver comprises a channel characteristic estimating section that uses a reference signal contained in the received signal for channel characteristic estimation (column 4 lines 6-13).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Yamamoto into the diversity receiver of Abe et al. as to use a reference signal contained in the received signal for estimating the power level, as an alternative of using the received data signal.

5. **Claims 2 and 7-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Abe et al. (JP 06-303171)** as modified by **Yamamoto (US Patent 6151372)** in view of **Kuroda (US Patent 6603961)**.

Consider **claim 2, as applied to claim 1 above**, Abe et al. as modified by Yamamoto clearly disclose the demodulated signal output unit outputs one of the demodulated signals, either the selected demodulated signal or the combined demodulated signal.

However, Abe et al. as modified by Yamamoto fail to disclose the received signals include a plurality of sub-carrier components.

In the same field of endeavor, Kuroda clearly discloses a diversity receiver; the received signals include a plurality of sub-carrier components (In the Orthogonal Frequency Division Multiplexing (OFDM) method, a signal is divided into several sub-carriers) (column 1 lines 38-47, figure 3).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Kuroda into the diversity receiver of Abe et al. as modified by Yamamoto for increasing its utility as accepting more radio frequency transmission methods such as OFDM method.

Consider **claim 7, as applied to claim 1 above**, Abe et al. as modified by Yamamoto fail to disclose the first received signal is an orthogonal frequency division multiplexing (OFDM) signal modulated by an OFDM modulation system; and the estimated power value calculator uses a pilot signal included in the OFDM signal as the reference signal.

In the same field of endeavor, Kuroda clearly discloses the first received signal is an orthogonal frequency division multiplexing (OFDM) signal modulated by an OFDM modulation system; and the estimated power value calculator (figure 3, 106.sub.1) uses a pilot signal included in the OFDM signal as the reference signal (figure 3, column 2 line 66-column 3 line 56).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Kuroda into the diversity receiver of Abe et al. as modified by Yamamoto for increasing its utility as accepting more radio frequency transmission methods such as OFDM method.

Consider **claim 8, as applied to claim 1 above**, Abe et al. as modified by Yamamoto fail to disclose the first received signal is an OFDM signal modulated by an OFDM modulation system, further comprising: a sub-carrier power calculator that outputs a sub-carrier power of a sub-carrier component obtained by a Fourier transform of the OFDM signal, as said first power.

In the same field of endeavor, Kuroda clearly discloses the first received signal is an OFDM signal modulated by an OFDM modulation system, further comprising: a sub-carrier power calculator (figure 3, 106.sub.1) that outputs a sub-carrier power of a sub-carrier component obtained by a Fourier transform (figure 3, 105.sub.1) of the OFDM signal, as said first power (figure 3, column 1 lines 38-57).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Kuroda into the diversity receiver of Abe et al. as modified by Yamamoto for increasing its utility as accepting more radio frequency transmission methods such as OFDM method, and as to include a sub-carrier power calculator and a Fourier transform circuit for adapting of as using OFDM method.

Consider **claim 9, as applied to claim 1 above**, Abe et al. as modified by Yamamoto fail to disclose a gain detector that outputs a power control signal corresponding to a gain adjustment quantity for adjusting said first power to a predetermined power level.

In the same field of endeavor, Kuroda clearly discloses a gain detector that outputs a power control signal corresponding to a gain adjustment quantity for adjusting said first power to a predetermined power level (figure 3, column 3 lines 14-30).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Kuroda into the diversity receiver of Abe et al. as modified by Yamamoto as to include an automatic gain control (AGC) circuit to adjust the received signal power level to a predetermined power level for improving signal processing and detection.

Consider **claim 10, as applied to claim 9 above**, Abe et al. as modified by Yamamoto and Kuroda clearly disclose the power ratio comparator performs the comparison.

In the same field of endeavor, Kuroda clearly discloses an estimated power value calculator (figure 3, 106.sub.1) that outputs an estimated power value corresponding to a result of channel characteristic estimation using a reference signal contained in the first received signal as said first power (figure 3, a signal received by antenna 101.sub.1 is processed through elements 102.sub.1, 103.sub.1 and 105.sub.1 before being calculated by received power detecting device 106.sub.1), wherein: the power ratio comparator performs the comparison by using a result of multiplication (figure 3,

multiplying device 107.sub.1) of the estimated power value (output of 106.sub.1) by a coefficient (detected strength of the received signal) determined by the gain adjustment quantity (AGC circuit) (figure 3, column 3 lines 14-30).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Kuroda into the diversity receiver of Abe et al. as modified by Yamamoto and Kuroda as for improving signal processing and signal level detection accuracy.

Consider **claim 11, as applied to claim 9 above**, Abe et al. as modified by Yamamoto and Kuroda clearly disclose a power ratio comparator.

In the same field of endeavor, Kuroda clearly discloses a sub-carrier power calculator (figure 3, 106.sub.1) that outputs a sub-carrier power of a sub-carrier component obtained by a Fourier transform (figure 3, 105.sub.1) of the first received signal, the first received signal being an OFDM signal (column 1 lines 38-57), wherein: the power ratio comparator uses a result of multiplication (figure 3, 107.sub.1) of the sub-carrier power value (output of 106.sub.1) by a coefficient (detected strength of the received signal) determined by the gain adjustment quantity (AGC circuit) as the first power (figure 3, column 3 lines 14-30).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Kuroda into the diversity receiver of Abe et al. as modified by Yamamoto and Kuroda as for increasing its utility as accepting more radio frequency transmission methods such as OFDM method, and to include a sub-carrier power calculator and a Fourier transform

circuit for adapting of as using OFDM method, further to include an AGC circuit for improving signal processing and signal level detection accuracy.

**Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Abe et al. (JP 06-303171)** as modified by **Yamamoto (US Patent 6151372)** and **Kuroda (US Patent 6603961)** in view of **Sano (US Patent 5697083)**.

Consider **claim 12, as applied to claim 9 above**, Abe et al. as modified by Yamamoto and Kuroda clearly disclose a threshold conversion table unit that prestores, and outputs to the power ratio comparator (Abe et al. paragraph 0010).

However Abe et al. as modified by Yamamoto and Kuroda fail to disclose a threshold value corresponding to the gain adjustment quantity.

In the same field of endeavor, Sano clearly discloses a threshold value corresponding to the gain adjustment quantity (figure 9, column 9 line 61-column 10 line 14, a threshold in this claim is not considered as a power ratio threshold which is determined based on gain adjustment quantity as disclosed in specification).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Sano into the diversity receiver of Abe et al. as modified by Yamamoto and Kuroda as for improving quality.

#### ***Allowable Subject Matter***

6. **Claims 13-14** are allowed.

7. The following is an Examiner's statement of reasons for allowance:

Consider **claim 13**, the best prior art of record found during the examination of the present application, **Abe et al. (JP 06-303171)** in view of **Kuroda (US Patent 6603961)** further in view of **Miyanaga et al. (US Pub. # 2002/0168039)** fail to specifically disclose, teach, or suggest that the power ratio comparator uses the power control signal and said number of errors or said error rate in comparing the power ratio with the predetermined threshold value.

Abe et al. clearly disclose a diversity receiver comprising (figure 1): a plurality of demodulation paths (figure 1, receive sections 2 and 12) for demodulating received signals and outputting demodulated signals; a power ratio comparator (receiving level ratio judging section 22) for calculating a power ratio from a first power corresponding to a first received signal on one of the demodulation paths (RSSI 1) and a second power corresponding to a second received signal on another one of the demodulation paths (RSSI 2), and comparing the power ratio (level ratio judging section 25) with a predetermined threshold value (threshold store 26); a signal selector (control section 8, switch 6) for selecting one of the demodulated signals output from the plurality of demodulation paths and outputting the selected demodulated signal; an equal-gain signal combiner (synthetic section 5) for combining the demodulated signals output from the plurality of demodulation paths with predetermined gains, and outputting a combined demodulated signal (control section 8, switch 7); and a demodulated signal output unit for outputting one of the demodulated signals, either the selected demodulated signal or the combined demodulated signal, responsive to a result of the

comparison in the power ratio comparator (control section 8, switches 6 and 7) (paragraphs 0006, 0007 and 0010, figures 1 and 2).

In the same field of endeavor, Kuroda clearly discloses a gain detector that outputs a power control signal corresponding to a gain adjustment quantity for adjusting said first power to a predetermined power level (figure 3, column 3 lines 14-30); an estimated power value calculator (figure 3, 106.sub.1) that outputs an estimated power corresponding to a result of channel characteristic estimation using a reference signal contained in the first received signal (figure 3, a signal received by antenna 101.sub.1 is processed through elements 102.sub.1, 103.sub.1 and 105.sub.1 before being calculated by received power detecting device 106.sub.1).

In the same field of endeavor, Miyanaga et al. clearly disclose a pre-combination error correction unit (figure 1, error detector 12a, error corrector 14a) that outputs a number of errors or an error rate obtained as a result of error correction of the demodulated signal output from said one of the demodulation paths before it is input to the demodulated signal output unit (figure 1, paragraph 0056).

Abe et al. clearly disclose the power ratio comparator (figure 2, comparator 25) uses the estimated power (RSSI1 and RSSI2) in comparing the power ratio with the predetermined threshold value (threshold a). This teaching clearly differs from the claimed invention; therefore, claim 13 of the present application is considered novel and non-obvious over the prior art and, consequently, is allowed.

Consider **claim 14**, the best prior art of record found during the examination of the present application, **Abe et al. (JP 06-303171)** in view of **Kuroda (US Patent**

**6603961**) further in view of **Miyanaga et al. (US Pub. # 2002/0168039)** and **Tomiyoshi et al. (US Patent 6628733)** fail to disclose the power ratio comparator uses the power control signal, the number of errors or the error rate output from the pre-combination error correction unit, and the number of errors or the error rate output from the error correction unit in comparing the power ratio with the predetermined threshold value.

Abe et al. clearly disclose a diversity receiver comprising (figure 1): a plurality of demodulation paths (figure 1, receive sections 2 and 12) for demodulating received signals and outputting demodulated signals; a power ratio comparator (receiving level ratio judging section 22) for calculating a power ratio from a first power corresponding to a first received signal on one of the demodulation paths (RSSI 1) and a second power corresponding to a second received signal on another one of the demodulation paths (RSSI 2), and comparing the power ratio (level ratio judging section 25) with a predetermined threshold value (threshold store 26); a signal selector (control section 8, switch 6) for selecting one of the demodulated signals output from the plurality of demodulation paths and outputting the selected demodulated signal; an equal-gain signal combiner (synthetic section 5) for combining the demodulated signals output from the plurality of demodulation paths with predetermined gains, and outputting a combined demodulated signal (control section 8, switch 7); and a demodulated signal output unit for outputting one of the demodulated signals, either the selected demodulated signal or the combined demodulated signal, responsive to a result of the comparison in the power ratio comparator (control section 8, switches 6 and 7) (paragraphs 0006, 0007 and 0010, figures 1 and 2).

In the same field of endeavor, Kuroda clearly discloses a gain detector that outputs a power control signal corresponding to a gain adjustment quantity for adjusting said first power to a predetermined power level (figure 3, column 3 lines 14-30); an estimated power value calculator (figure 3, 106.sub.1) that outputs an estimated power corresponding to a result of channel characteristic estimation using a reference signal contained in the first received signal, as said first power (figure 3, a signal received by antenna 101.sub.1 is processed through elements 102.sub.1, 103.sub.1 and 105.sub.1 before being calculated by received power detecting device 106.sub.1).

In the same field of endeavor, Miyanaga et al. clearly disclose a pre-combination error correction unit (figure 1, error detector 12a, error corrector 14a) that outputs a number of errors or an error rate obtained as a result of error correction of the demodulated signal output from said one of the demodulation paths before it is input to the demodulated signal output unit (figure 1, paragraph 0056).

In the same field of endeavor, Tomiyoshi et al. clearly disclose an error correction unit (figure 2, reception signal quality measuring unit 10) that outputs a number of errors or an error rate obtained as a result of error correction of the demodulated signal output from the demodulated signal output unit (figure 2, column 6 lines 20-23).

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Abe et al. clearly disclose the power ratio comparator (figure 2, comparator 25) uses the estimated power (RSSI1 and RSSI2) in comparing the power ratio with the predetermined threshold value (threshold a). This teaching clearly differs from the claimed invention; therefore, claim 14 of the present application is considered novel and non-obvious over the prior art and, consequently, is allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any response to this Office Action should be **faxed to (571) 273-8300 or mailed**

**to:** Commissioner for Patents  
P.O. Box 1450  
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**Hand-delivered responses** should be brought to

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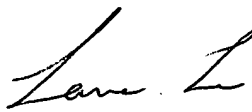
Any inquiry concerning this communication or earlier communications from the examiner should be directed to RuiMeng Hu whose telephone number is 571-270-1105. The examiner can normally be reached on Monday - Thursday, 8:00 a.m. - 5:00 p.m., EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on 571-272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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March 6, 2007

  
3-13 -07  
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